

Records and descriptions of African Encyrtidae - 1 (Hymenoptera Chalcidoidea)

by

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This paper deals with Encyrtidae which were submitted to the writer for determination, or collected during the course of his work. The types of new species will be deposited in the National Collection of Insects, Division of Entomology, Pretoria; paratypes of species described on good series will be sent to the British Museum (Natural History), London, the United States National Museum, Washington, D.C., and the Transvaal Museum, Pretoria.

Microterys pudaspidis spec. nov. figures 1, 2 and 4

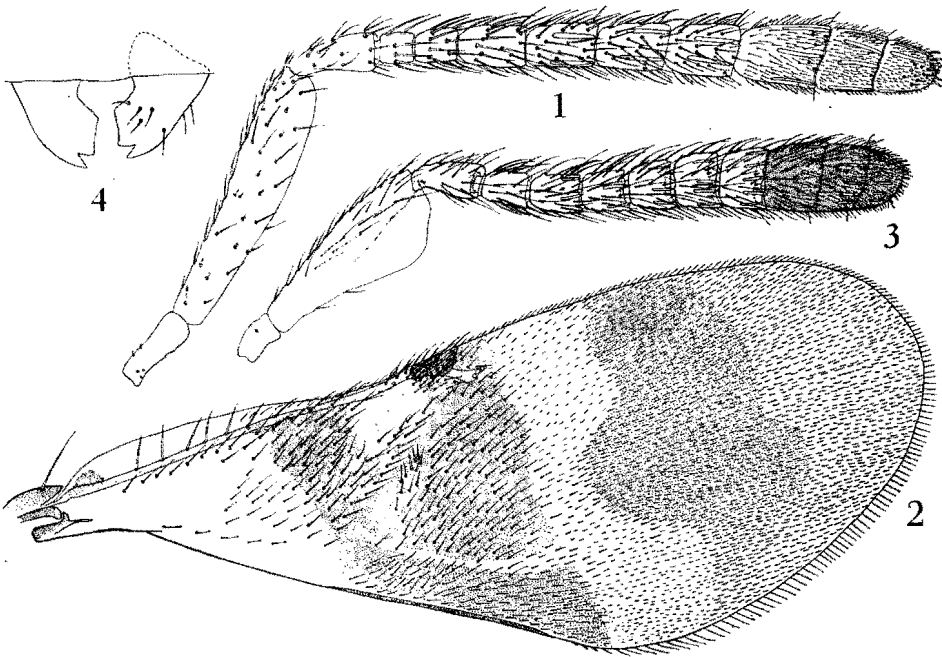
This species is keyed out in the accompanying key with *M. saissetiae* Compere from which species it differs in the marking of the legs, the shallow scrobes, the setation of the scutellum, and in having the apex of the fore wing clear.

FEMALE: Head and body predominantly testaceous except the mesoscutum which is brown with metallic blue and green reflections, the axillary sclerites which are dark brown, and the dorsum of the abdomen which is brown with metallic reflections across the base; antennae testaceous to brownish except the last funicle segment which is yellowish-white, and the club which is dark brown fading a little apically; setae on the pedicel and funicle strong and dark except the last funicle segment which has pale setae; legs entirely testaceous except for a dark brown patch externally at the base of the middle and hind tibia, a further patch just beyond the middle of each of these segments, a less distinct brown mark dorsally near the tip of the hind femur, and a small mark on the inner aspect of the middle femur near the apex; fore tibia with a small indistinct brown mark at base; middle tibial spur testaceous, apically dark; fore wings infuscated broadly beneath the distal half of the venation, this infuscation bordered distally by an entire pale cross-band; beyond this is a further broad infuscation which fades strongly towards the caudal margin of the wing; apex of wing widely hyaline or nearly so.

Head a little more than four times wider than frontovertex at narrowest behind the lateral ocelli; the latter separated from each other by less than once,

from the eye-margins by about one-half, and from the anterior ocellus by not quite twice their own diameter; ocelli in a strongly acute-angled triangle; antennal insertions less than their own length from the mouth, about twice this length apart or a little more; scrobes short, not deeply impressed, each narrowing sharply dorsally, not confluent above; maxillary palpi with four, labial with three segments; mandibles (fig. 4) with a strong, acute ventral tooth and a broad dorsal truncation; antenna (fig. 1) with scape slender, grooved apically, about as long as the first five funicle segments together, and about as wide as the last; pedicel about as long as the first two funicle segments together and a little wider than the first; funicle segments all longer than wide, increasing in size from the second to the last, the second being only slightly longer than the first; club about as long as the last three funicle segments together and somewhat wider than the preceding segment; funicle segments III to VI and all club segments with rhinaria. Head finely and uniformly reticulate, with scattered slender setae.

Thorax with pronotum scarcely visible in dorsal view, with mesonotum in dried specimens flat, much more so than in *M. saissetiae*; mesoscutum wider



Figs. 1, 2 and 4. *Microterys pudaspidis* spec. nov. 1. Antenna (paratype T 615-2); 2. forewing (paratype T 615-1); 4. mandibles, drawn from front view of head (paratype T 615-1).

Fig. 3. *Microterys capensis* spec. nov. Female antenna (paratype T 412).

than long, evenly setose, evenly and finely reticulate; scutellum wider than long, evenly setose, evenly and finely reticulate; scutellum about as wide as long, strongly reticulate, appearing granular like *M. saissetiae*, with six or seven strong black setae on each side, the anterior two or three smaller, more slender, placed along each of the axillar margins, the remaining setae becoming stronger towards the apex.

Legs long and slender, the tibial spur of the middle pair longer than the first two segments of the middle tarsus, and equipped with a row of stout conical setae like the tarsal segments.

Fore wing as in figure 2; hind wing densely and evenly setose, hyaline.

Abdomen heart-shaped in cleared slide-mounts, the cercal plates strongly advanced to a position anterior to the middle; ovipositor about as long as the abdomen, and about as long as the middle tibia; gonostyli very shortly exerted, slender, about one-fourth as long as the ovipositor.

Material examined: Pienaarspoort (Tvl.), September 1961, D. P. Annecke, with *Pudaspis newsteadi* and *Ceroplastes africanus* on *Acacia karroo* Hayne (T 615, holotype and 11 ♀ - paratypes); Pienaarspoort (Tvl.), January and March 1953, E. C. G. Bedford, ex *Pudaspis newsteadi* on *Acacia karroo* Hayne (AcPL 531, 3 ♀ - paratypes).

The foregoing species represents a departure from typical *Microterys* species in that the host is a diaspine scale insect according to Mr Bedford's rearings which are taken to be reliable. Morphologically however there seems to be insufficient justification for placing the species in a genus distinct from the other *Microterys* species at hand.

Microterys fuscipennis Compere, 1928

This species was described from nine females (Compere, 1928) collected by E. W. Rust at Durban (Natal), 1926. At hand is a dissected female specimen on a slide bearing the determination in Rust's handwriting "*Microterys rusti* Comp." and the data "Durban, So. Africa, Oct. 9, 1925". A pencil note by Rust on the label gives his number M 20 and the rearing record "Ex Big O". This specimen agrees exactly with the description of *M. fuscipennis*, and it is possibly Rust's reference specimen. The name given by Rust on the label has not been published so far as the writer's records show. The slide was found among a collection of old slides in the Parasite Laboratory, Division of Entomology, Pretoria.

The host of *M. fuscipennis* was given by Compere (1928) as an undetermined coccid that indents the leaves of *Chaetacme aristata*. During a recent visit to Durban, the writer collected a coccid on the leaves of this tree, apparently the one referred to by Compere (l.c.), and from these a single specimen of each sex of *M. fuscipennis* emerged. This hitherto unknown male is herewith designated the metalotype, and briefly described.

♂ - METALLOTYPE: Dark metallic on head, notum of thorax and abdomen; lateral and ventral parts of thorax brownish to blackish; legs dark testaceous

except middle and hind coxae largely and hind tibiae save the ends, suffused with blackish; antennal scape and pedicel blackish, flagellum dark brown, rather densely setose; wings entirely hyaline, the venation brown. Head twice as wide as frontovertex; ocelli large, in an obtuse-angled triangle, the lateral pair less than their own diameter from the orbits and from the fronto-occipital margin; antennal insertions about equidistant from the eyes and mouth; scape strongly expanded ventrally, about twice as long as wide; pedicel longer than wide, shorter than all except the last funicle segment; funicle with segments subequal in width, gradually decreasing in length distad, the sixth about as long as the pedicel; club about as long as the last two funicle segments together. Thorax with strong, reticulated sculpture on the dorsum, with mesoscutum wider than long; axillae not meeting medially, distinctly separated by a median salient of the mesoscutum; scutellum longer than wide, like the mesoscutum evenly setose, and with two strong erect setae near the apex. Legs and wings as described. Abdomen pointed apically, narrow, shorter than the thorax.

The foregoing description has been drawn up from a single card-pointed specimen bearing the following data: Durban, v. 1961 (D. P. Annecke), ex T 449 on *Chaetacme aristata*. The number T 449 refers to the host coccid which has been determined by Mr G. De Lotto, Scott Agricultural Laboratories Nairobi, Kenya, as representing an undescribed genus and species (S.A.L. Coll. No. 2675).

Microterys capensis spec. nov., figure 3

This new species is very similar to *kenyaensis* Compere (Compere, 1939, 1940) and is compared with that species.

FEMALE: Head testaceous to light brown, oral margin concolorous, thorax dorsally semitransparent, brown to dark brown, laterally and ventrally light brown; mesoscutum with only very faint metallic reflections under some plays of light; metanotum shining dark brown to black, propodeum concolorous except laterodorsal angles widely which are brown; abdomen shining dark brown to nearly blackish dorsally, lighter elsewhere; colour of antenna as in *kenyaensis* except the ventral margin of the scape which is not infuscated. Frontovertex about one-fourth the width of the head, not one-fifth as in *kenyaensis*; ocellar triangle nearly equilateral; lateral ocelli about their own diameter from the orbits, about twice this diameter from the fronto-occipital margin; scrobes as in *kenyaensis*; antenna (fig. 3) with scape about two and one half times longer than its greatest width, the expansion slightly more abrupt than in *kenyaensis*; funicle differing from that of the latter species in having the segments all shorter than the pedicel, the first three longer than wide, the fourth subquadrate, and the last two wider than long; club about as long as the last three funicle segments together, its first segment the longest, all segments wider than long; thorax and legs as described for *kenyaensis* except in colour; fore wings as in that species except that the

curved transverse pale band is of about equal width from the cephalic to the caudal wing margin, and that the blade of the wing beneath the basal half of the submarginal vein is evenly infuscated and bears normal setae except on the caudal part (cf. Compere, 1940: 419, fig. 6). Abdomen shorter than thorax, ovipositor shortly exerted.

Male agreeing with the description of the males believed by Compere (1940) to belong to *M. kenyaensis*.

Material examined: Hout Bay (C.P.), October 1956, H. K. Munro, on *Cotyledon orbiculata* with Coccid 5131; C.I.E. No. 15444; AcPL 1047 (♀ ♀), AcPL 1048 (♂ ♂), holo-, allo- and seven paratypes, T 412. According to records in the National Collection of Insects, Division of Entomology, the coccid under AcP 5131 is *Pulvinaria* species.

Microterys flavus (Howard)

Apparently this species has not hitherto been recorded from South Africa. Material at hand consists of three ♀ ♀ collected in association with *Coccus hesperidum* L. on citrus at Zebediela (Tvl.), January-April 1957, D. P. Annecke; also numerous specimens of both sexes reared during 1959/60 by H. J. Merrem at the same locality from *C. hesperidum* on citrus. The writer is indebted to Mr H. Compere, University of California Citrus Experiment Station, Riverside, for identifying this species.

Key to the African species of *Microterys* Thomson*

FEMALES

1. Scape expanded and flattened below, from two to three times as long as wide. Scrobes wide and shallow, usually semicircular and broadly confluent above 4
- Scape not expanded and flattened below, slender, becoming gradually wider distad, the ventral surface sometimes with a slight keel at apex. Scrobes narrow and deep, or at least clearly separated dorsally 2
2. Fore wing with a single pale cross-band beyond the venation 3
- Fore wing with two pale cross-bands beyond the venation *umbrinus* Compere
3. Middle and hind tibiae strongly marked with contrasting dark patches or incomplete bands *pudaspidis*
- Middle and hind tibiae unicolorous, without contrasting dark patches or bands *saissetiae* Compere
4. Fore wing with at least one entire pale cross-band beyond the venation 5
- Fore wing evenly infuscated from near the base to near the apex *fuscipennis* Compere

* Species too poorly known for consideration here are as follows: *Microterys ceroplastodesi* Risbec (1951: 163-5) known from three ♂ ♂ only, may or not be correctly placed in the genus; *M. rizicola* Risbec (1956: 134-8), allegedly an egg parasite, may or may not be correctly assigned to *Microterys*; and *Encyrtus eugeniae* Risbec (1952: 43-6) which resembles a species of *Microterys* rather than *Encyrtus* although the description and figures are not adequate to be sure of this.

5. Fore wing with two pale cross-bands beyond the venation, the distal one of which may be broadly interrupted at the middle 7
- Fore wing with a single pale cross-band beyond the venation 6
6. Frontovortex one-fifth as wide as head; ocelli in a strongly acute-angled triangle, the lateral pair close to the orbits; ventral margin of scape and mouth margin narrowly black *kenyaensis* Compere
- Frontovortex one-fourth as wide as head; ocelli in a nearly equilateral triangle; lateral ocelli about their own diameter from the orbits; ventral margin of scape and mouth margin not edged with black *capensis*
7. Fore wing with two entire whitish cross-bands beyond the venation 8
- Fore wing with a single entire cross-band, the second one broadly interrupted at the middle by a salient of the infuscated distal part of the wing *flavus* (Howard)
8. Almost completely brown with the following parts darker: concealed centre of pronotum, metanotum and centre of propodeum *nicholsoni* Compere
- Dominantly dark metallic with the following parts testaceous or brownish orange: head, collar of pronotum and sometimes mesopleura *bizanensis* Compere

Encyrtus bedfordi spec. nov., figures 5-9

FEMALE: Colour black, non-metallic, shiny; radicle and scape brown, the latter blackish dorsally towards the apex; pedicel brown, blackish dorsally; funicle brown, becoming darker distally, sixth segment very dark brown to blackish; club dark brown, the last segment a little lighter; fore coxa whitish towards the apex, darker on the basal half; femur brown, darker at the end; tibia nearly black externally, brown internally and at the apex; tarsus dark brown, last segment blackish; middle coxa blackish except laterally at the base where it is whitish; femur and tibia brown save a little more than the basal half of the latter which is blackish; tibial spur brown, darker apically; tarsus dark brown, the last segment blackish; hind coxa whitish except the apex which is dark brown; remainder of hind leg blackish with variable dark brown suffusions on outer and inner aspects. Fore wing infuscated beyond the base of the oblique hairless streak (fig. 9), and with an infuscation and a cluster of strong black setae at the level of the distal third of the submarginal vein. Sculpture and chaetotaxy: head save occiput with dense, pitted punctations, denser than in other species examined, each one about half the size of an ocellus, becoming slightly larger below the anterior ocellus and each bearing a short curved seta; about 10-12 such punctations across the narrowest part of the frontovortex; surface of head reticulate; pronotum transversely lineolate-reticulate; mesoscutum and axillae punctate-reticulate, the setae dense, slender and shiny; scutellum strongly reticulate, setose, the scutellar spines not in a tight cluster but scattered over the distal three-fifths or so of the disc; abdomen shiny, with reticulate sculpture and setae becoming more numerous distally.

Head in dorsal view a little more than three times wider than its greatest fronto-occipital length; frontovortex sloping strongly forward from the sharply-angled, arcuate fronto-occipital margin (similar to that of *E. californicus*

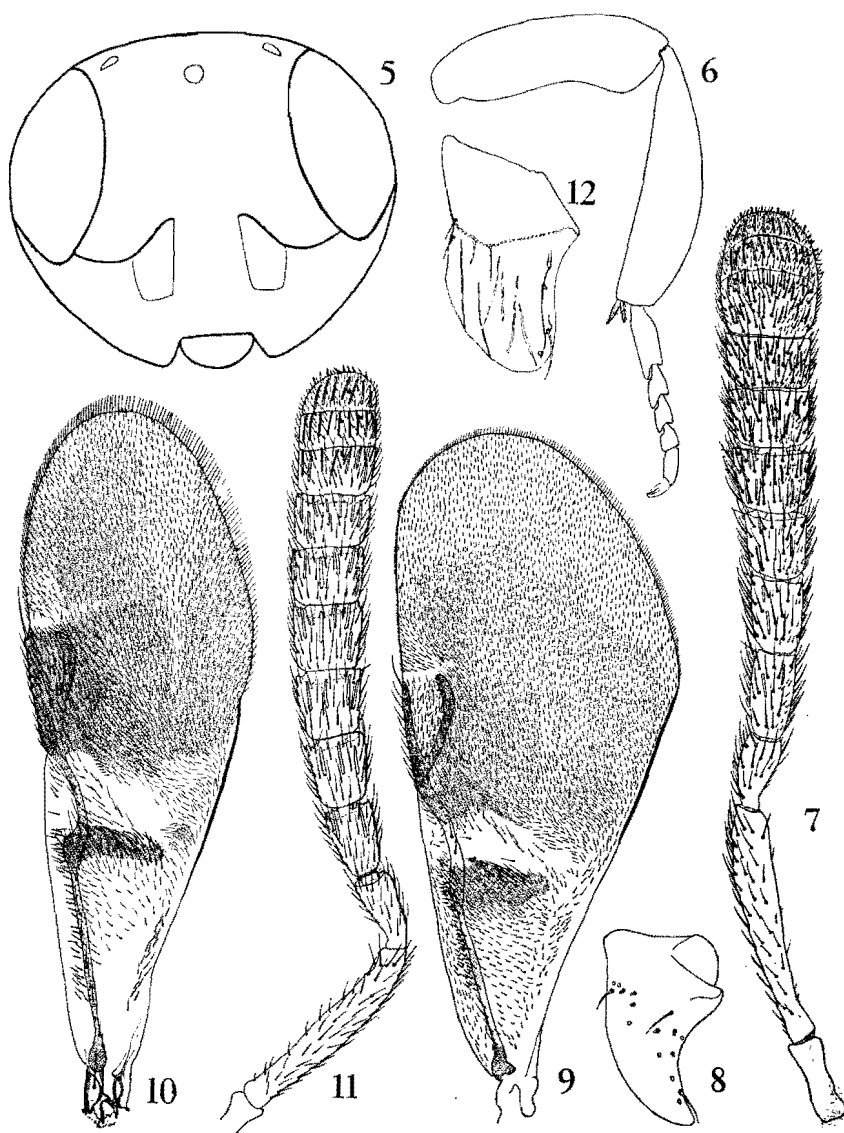
Grlt.); ocelli in an obtuse-angled triangle, the lateral pair removed from the fronto-occipital margin by about their own diameter, from the eyes by about one-half, and from the anterior ocellus by nearly five times this diameter; frontovertex at narrowest about one-half the width of the head; in frontal view (fig. 5) the head is a little wider than high, eyes longer than the cheeks, upper level of antennal insertions placed just above the lower level of the eyes; each antennal insertion placed beneath the mesal end of a ledge or shelf which curves downward and then upward to meet the eye at about its lowest point on the face; unlike several other species studied (see below), this ledge extends across the face between the antennal insertions only as an indistinct suture-like line, not as a well defined ledge; face evenly and continuously convex frontally, the convexity interrupted only by the antennal insertions and the described ledges; occiput correspondingly concave; mandible shorter than in other species, broader at base, more acute apically (fig. 8); antenna (fig. 7) characteristic of the genus, the radicle long and slender; scape slender becoming thicker distally, about as long as the next three segments together; pedicel shorter than the first, about as long as the second funicle segment, nearly twice longer than its greatest width; funicle segments I-VI gradually becoming shorter and wider, I just more than twice longer than wide, VI nearly twice wider than long; club only a little longer than the last two funicle segments together, its last two segments strongly transverse; all funicle segments with scattered rhinaria becoming more numerous distally; club segments with numerous rhinaria, the last with many sense-cones; scape, pedicel and funicle with indistinct reticulated sculpture; all segments except the last club segment rather densely setose; all funicle segments and the first club segment with minute setae on the ventral and lateral surfaces.

Thorax stout, strongly developed, with pronotum about one-fifth as long as mesoscutum in dorsal view, the latter not twice as wide as long (8:5), its hind margin not transverse but slightly convexly rounded posteriorly; axillae strong but their dorsal surface not strongly elevated; scutellum about twice as long as wide, bluntly rounded apically, elevated but not strongly on the disc, depressed anterolaterally behind the axillae, posteriorly obscuring all but the lateral arms of the metanotum; propodeum almost vertical medially, strongly sloping laterally.

Fore legs not especially modified; middle legs with femora somewhat flattened, especially the ventral surface distally; mid tibial spur about as long as the basal tarsal segment; hind leg (fig. 6) with femora and tibiae, especially the former, more strongly compressed than in other species studied (see below), the femur with a distinct laminate expansion ventrally near the apex; hind tibial spurs strong, subequal.

Fore wings as in figure 9; hind wings hyaline.

Gaster slightly narrower than the thorax, and much shorter; cercal plates advanced laterally to about halfway along the length of the gaster; ovipositor not much more than half as long as the middle tibia; last sternite not fully enclosing the ovipositor.



Figs. 5-9. *Encyrtus bedfordi* spec. nov. 5 Head, frontal view (paratype on card-point); 6. hind leg (paratype T 323-1); 7 antenna (paratype T 323-1); 8 mandible (paratype T 323-1); 9 forewing (paratype T 323-1).

Figs. 10-12. *Encyrtus sacchari* spec. nov. (paratype T 444-1). 10. Forewing; 11. antenna; 12. mandible.

Material examined: Pienaarspoort (Tvl.), February-May 1954, E. C. G. Bedford, from *Ceroplastes mimosae* Sign. on *Acacia karroo* Hayne, holotype and 32 ♀ - paratypes. The holotype and 21 paratypes are entire, preserved on cardpoints, 10 paratypes are more or less damaged and similarly preserved, and one paratype (T 323) is partly dissected after clearing in caustic soda, and preserved on a slide in Canada Balsam. The species is named for Mr Bedford, who collected all the specimens.

Certain characters mentioned above set this robust species apart from others in the genus known to the author. These characters are the short, subacutely pointed mandible, the expanded hind femur, the scutellar spines being dispersed over the disc of the scutellum and not tightly clustered, and the uniformly black colour of the body. The new species has been compared with specimens of the following species: *Encyrtus infelix* Embleton, *californicus* (Girault), *barbatus* Tiberlake, *fuscus* (Howard), *fuliginosus* Compere and *lecaniorum* (Mayr); also with the other new species described in this article, and with several presumably undescribed species in the author's collection. Mr Compere has kindly examined material of *E. bedfordi*, and the author is grateful for his remarks on the generic placement of the species.

Encyrtus sacchari spec. nov., figures 10-12

Colour non-metallic, shining black save the scutellum which is entirely creamy white except for a narrow transverse black band at the apex; scutellar tuft of setae strong, black, suberect, grouped in a tight cluster; scape blackish dorsally, elsewhere sordid white, remainder of antenna black; fore coxa, trochanters, femur and tarsus whitish, tibia brownish especially on basal half and on dorsal surface; middle legs black except the extreme apex of the femur, the apical half or third of the tibia, the tibial spur and tarsus, all of which are brownish-white; hind leg black except for the coxa and a small patch near the end of the femur which are sordid white; hind tarsus white except for the basal third of the first segment which is black; last tarsal segments of all legs more or less blackish. Fore wings infuscated as in fig. 10. Sculpture of head finely, transversely lineolate-reticulate, with numerous shallow pits on the frontovertex and face above the antennal insertions; about four to six such pits between the eyes across the narrowest part of the frontovertex, each pit with a short seta; cheeks and interscrobial area finely punctate-reticulate, more densely setose than the frontovertex; mesoscutum finely punctate-reticulate on the disc, longitudinally lineolate-reticulate laterally, with numerous slender setae; axillae very strongly punctate-reticulate, the setae strong and dark; scutellum finely, longitudinally lineolate-reticulate, with slender, white setae on the white part and scutellar tuft of black spines well-developed on the black apical part; propodeum with two subparallel median carinae, reticulate laterally and around the spiracles, medially smooth; abdomen shiny and finely reticulate, with strong setae towards the apex dorsally and numerous small setae on the last sternite.

Head with frontovertex at narrowest plainly less than half the width of the head; ocelli small, placed in a slightly obtuse-angled triangle, the lateral pair removed from the orbits by about their own diameter; upper margin of the antennal insertions at about the lower level of the eyes, the insertions placed beneath a well-defined, strongly curving ridge, each one separated from the orbits by slightly less than their interval, and from the mouth by less than one-half their interval; antenna as in fig. 11; mandible blunt-tipped, as in fig. 12; maxillary and labial palpi normal for the genus, with four and three segments respectively.

Thorax less robust than in other species at hand [e.g. *E. lecaniorum* (Mayr), *E. fuliginosus* Compere, and the other species described in this paper], with mesoscutum about twice as wide as long, its hind margin not quite straight but with a slight median salient; axillae separated from the mesoscutum and scutellum by strong, deep sutures, each axilla sloping strongly caudad and with vertical sides; scutellum longer than wide, rounded from side to side, not strongly elevated; metanotum a narrow band with oblique lines of sculpture laterally; propodeum as described.

Legs not especially modified, rather slender, with tibial spur of middle leg nearly as long as the first two tarsal segments together.

Fore wing narrow, slightly more than three times longer than wide (fig. 10); with stigmal vein just longer than postmarginal, and with four distal pores placed in a line; oblique hairless streak well-developed; infuscation as in fig. 10; hind wing hyaline except for a narrow infuscation at the base of the venation, densely setose from near the base.

Abdomen with cercal plates strongly advanced, with ovipositor diminutive, the shaft not as long as the tibial spur.

Material examined: Mt. Edgecombe (Natal), May 1961, J. Dick, Dave Thomas and D. P. Annecke, from immature specimens of coccid species T 446 infesting the leaves of sugar-cane, holotype and 54 ♀-paratypes. Four specimens are mounted on slides (T 444), the remainder preserved dry on card-points. Mr G. de Lotto has determined the host coccid (T 446) as being a variety of *Pulvinaria elongata*.

Encyrtus sacchari is suggestive of the European species *E. infidus* (Rossi) which is regarded by Mercet (1921) to be identical with *E. scutellatus* (Swed.) also described from Europe. Mr Harold Compere kindly studied material of the present new species and the following is an extract from his letter to the writer (August 4, 1961):

"It is certainly different from the species in our collection from Italy under the names *infidus* Rossi and *scutellatus* (Swed). The latter were identified by Timberlake and the former by me. (The South African species) is smaller than these species, more slender; the frontovertex plainly narrower and less punctate; the wings narrower, the creamy white on the scutellum not forming a cross band as in *infidus* and *scutellatus* but covering the entire basal 3/4 or more of the scutellum, etc."

The species described above may easily be distinguished from other African species by its colour and other characters enumerated above.

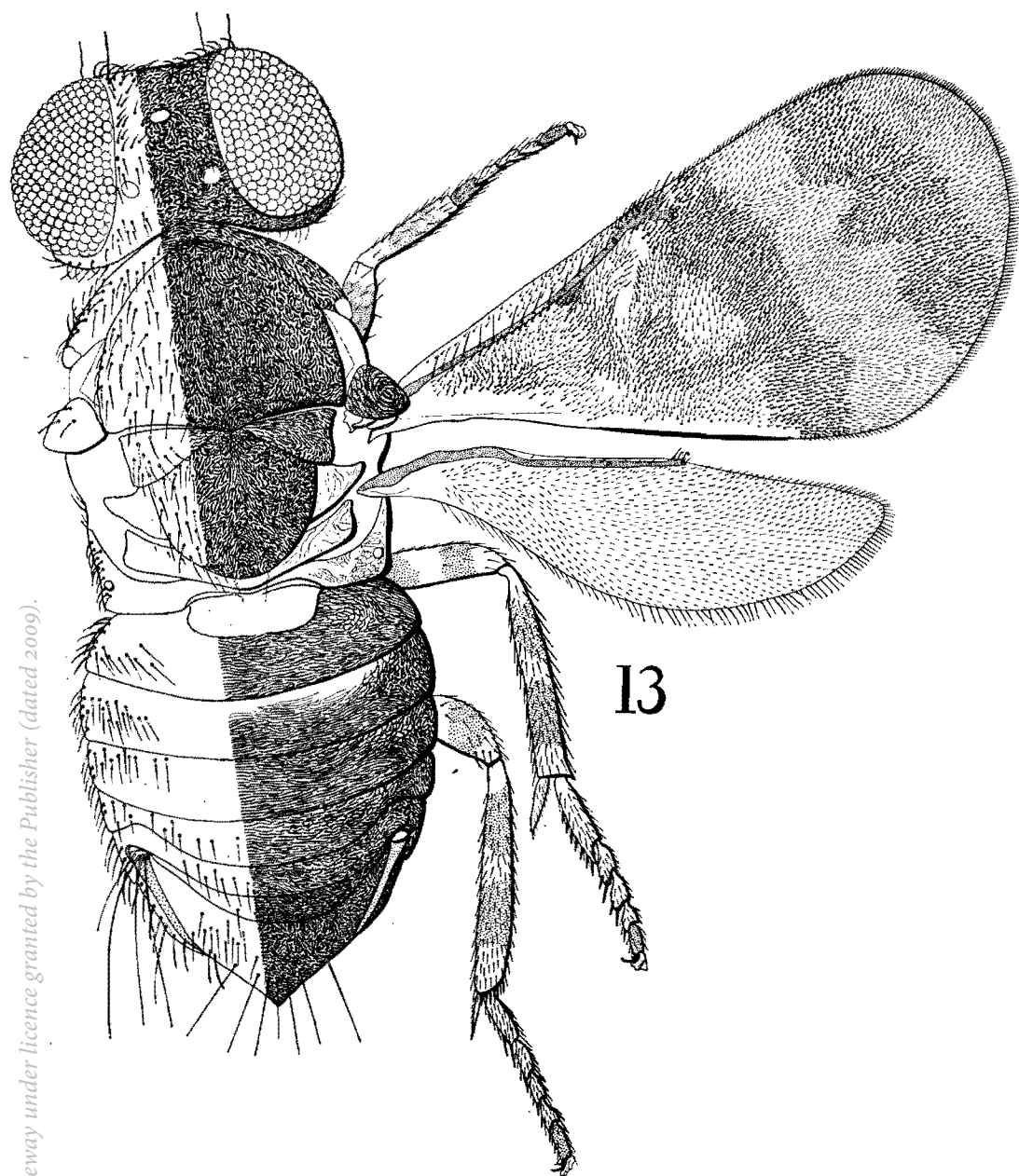
Bothriophryne juscicornis Compere, 1939

This species appears to be a common parasite of *Ceroplastes* species in South Africa. It was originally described from specimens reared from a *Ceroplastes* species on *Acacia* species at Villiersdorp (C.P.) (Compere, 1939). Additional host and locality records follow: TRANSVAAL: Zebediela, February 1961, H. J. Merrem, ex *Ceroplastes* species (probably *C. destructor* var. *brevicauda* Hall) on citrus, two ♀♀; Pienaarspoort, various dates, summer 1953/54, E. C. G. Bedford, ex *Ceroplastes mimosae* Sign. on *Acacia karroo* Hayne, 15 ♀♀, 23 ♂♂; September 1961, D. P. Annecke, (same host insect and plant), two ♀♀, three ♂♂; NATAL: Muden, July 1961, D. P. Annecke, ex *Ceroplastes mimosae* Sign. on *Acacia karroo* Hayne, three ♀♀; Ndumu Game Reserve, September 1961, D. P. Annecke, ex *Ceroplastes ?longicauda* Brain on *Grewia caffra* Meisn., 21 ♀♀, three ♂♂.

The above material has been determined from the literature, and nothing need be added to the original description. While collecting the material mentioned above at Ndumu Game Reserve, the writer captured two females and a single male and was able to observe mating in a large glass tube. The male was seen to chase after one of the females, overtake her, and with rapid movements of the antennae and fore legs attempt to bring the female's outthrust antennae down against her face, the tips close to her mouth. Once the male had succeeded in this, the female at once ceased movement and remained motionless, her abdomen somewhat raised against the folded wings, while the male positioned himself next to her, obliquely, facing the same direction. With a twist of the abdomen, the aedeagus was inserted into the gaping V-shaped last sternite of the female at the base of the ovipositor and insemination evidently occurred. The female ovipositor lies along the venter of the abdomen and is nearly as long as the gaster; only the base is enclosed by the sternites, so that insemination must necessarily be effected from the side by the male of this species which is only about one-half the size of the stout-bodied female. Within about seven seconds mating was apparently completed, and the two insects sprang away rapidly. About half an hour later, the male was seen to show interest in the second female, and following the same procedure, mating again occurred. In this case all that differed was that the male had some difficulty in catching the female;

EXPLANATION OF FIGURE

Fig 13. *Coccopilatus judithae* gen. et spec. nov., drawn partly from the ♀-holotype and partly from ♀-paratype T 367-1.



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this was finally accomplished by jumping onto her thorax, crawling forward over her head and forcing down the antennae in this way into the desired position. It would appear that in the observed cases the female was immobilized by having the antennae folded down onto her face; only after this was successfully accomplished could mating occur, and only after mating was apparently completed did the females return the antennae to the normal outthrust position.

Genus *COCCOPILATUS* gen. nov., figures 13, 23-27

FEMALE: Similar to *Metaphycus* Mercet and related mirine genera (*sensu* Compere and Annecke, 1960) but differing from all of these in combinations of the following characters: mandibles with an acute ventral tooth and a broad dorsal truncation; maxillary palpi with four segments, labial with three; antennal insertions placed just below the lower level of the eyes and about their own greatest diameter from the mouth; scape slightly swollen distally, shallowly grooved apically; funicle with six segments, club with three; thorax thickset, slightly convex on the dorsum, with pronotum strongly arcuate, without parapsidal furrows, with axillae distinctly separated medially by a slight salient of the hind mesoscutal margin, with scutellum broadly rounded apically, obscuring the metanotum medially; propodeum a very narrow band medially, longer laterally; legs without special modifications; fore wings with submarginal vein slightly widened on the apical half, distinctly paler before joining with the marginal which is a little longer than wide; postmarginal distinct, a little shorter than the stigmal; membrane of wing with striking areas bearing short, stout, black setae, their tips squarely truncate, many of them distinctly widened apically; these areas contrasting strongly with intervening areas and a cross-band bearing fine, slender setae which are almost invisible in balsam-mounts; hind wing hyaline, finely setose; gastral attachment to the propodeum about half as wide as the latter segment; gaster and genitalia similar to species of *Metaphycus* in structure. Integument of head and thorax heavily sclerotized, strongly and intricately sculptured on the thoracic dorsum with raised, irregularly arranged, curved ridges which do not quite meet neighbouring ones, giving a rugulose effect somewhat suggestive of species of *Anagyrus* Howard.

Male unknown.

Type of the genus: *Coccopilatus judithae* spec. nov.

Coccopilatus may be readily distinguished from *Metaphycus* and allies by the curious discal setation of the fore wing, the mandibular characters, and the heavily sclerotized and strongly sculptured integument. The new genus runs to *Aphycomorpha* Timberlake in the key of Compere and Annecke (1960) but differs in setation of the fore wing, in the shape of the abdomen, and in integumentary characters.

Coccopilatus judithae spec. nov., figures 13, 23-27

FEMALE: Colour of body black with back of head, face and mesopleura faintly reflecting metallic blue and green colours; tegula sordid white with a large black mark dorsally and apically; antenna black except for last funicle segment which is sordid white, first funicle segment which is faintly dusky, and second funicle segment which is brownish; all coxae black except the middle pair apically; all femora white except for a large oblique black mark on the basal half, and a narrow black band near the apex; all tibiae white with two black bands, the distal one the wider; tarsi white except apical segment which is black; fore wing with two black cross-bands on the distal half and with three irregular black patches beneath the submarginal vein; these black areas result almost entirely from the black colour of the discal setae, scarcely from infumations in the wing-membrane which in these areas is almost hyaline or very faintly infumated; intervening areas of fore wing hyaline with very fine setae. Head and thorax dorsally with numerous whitish setae, each one rather thick and curved onto the integument, becoming rather transparent and difficult to see in balsam-mounts.

Head (fig. 26) strongly shrivelled in dried material; eyes with scattered, fine setae; ocelli in an acute-angled triangle, the lateral pair removed from the orbits by about one-quarter, and from each other by a little more than three times, their greatest diameter; frontovertex, at narrowest, just more than one-quarter the width of the head, becoming wider caudad of the lateral ocelli; antennal insertions and mouthparts (figs. 24, 25) as described above; antenna (fig. 27) with slender radicle, scape three and one-half times longer than wide, with a distinct ventral notch at the apical third; pedicel less than twice longer than wide, less than one-third as long as the scape; first funicle segment just wider than long, preceded by a minute ring-segment; second to fourth funicle segments subequal, clearly wider than long; last two funicle segments about as wide as long, much larger than the preceding segments, the last slightly larger than the fifth; club, at widest, one and one-half times wider than the preceding segment, about as long as the funicle, the first club segment the longest, the other two successively shorter; longitudinal rhinaria on the last two funicle segments and on the club segments, numbering 2, 3, 6, 5, 6; scape and pedicel with strong reticulated sculpture, each cell containing numerous fine striae.

Thorax (fig. 13) with mesoscutum nearly one-third wider than long, without parapsidal furrows, with about 110 setae scattered over the surface; axillae each with about 10 setae; scutellum one-fifth wider than long, with about 70 setae scattered over its surface; metanotum obscured medially, with three small setae in a row along the cephalic margin on each side; propodeum bare dorsally, with numerous long, curved setae on the sides; mesophragma produced slightly into the base of the abdomen.

Wings (figs. 13, 23) as described above; oblique hairless streak with a few very fine ventral setae on the cephalic half, the caudal half interrupted dorsally by numerous stout and slender setae; discal setae apart from the stout black ones, almost invisible except under phase contrast illumination; blade of wing

free of infumation except for a small area beneath the widened part of the submarginal vein, and very faintly in the areas bearing the black setae; hind wing hyaline, densely and very finely setose.

Abdomen rounded apically, gonotergites not upturned; gonostyli triangular, about one-fifth as wide basally as long, pointed and just exerted apically; ovipositor about two-thirds as long as the abdomen in cleared, slide-mounted specimens; sterna not enclosing the ovipositor to the apex, the last with a transverse hind margin reaching a little more than midway along the ovipositor, and with a strong longitudinal median groove (seen in dried material) for receiving the basal part of the ovipositor; cercal plates retracted only to about the level of the hind margin of the morphological sixth tergum; terga III-VI more or less transverse; the hind margin of VI, the whole of VII and VIII curving cephalad on each side round the cercal plates; each of the first four gastral terga transversely lineolate-reticulate dorsally, this sculpture breaking up dorsolaterally, becoming cellulate-reticulate; the last three terga with more irregular, broken sculpture dorsally, particularly the last which is sculptured rather like the mesoscutum though not as heavily.

Measurements:

Holotype	
Length of body	1.19 mm.
Width of head	0.39 mm.
Width of frontovertex at anterior ocellus	0.11 mm.
Length of ovipositor	0.39 mm.
Length of gonostylus	0.09 mm.
Length of scape	0.16 mm.
Width of scape	0.05 mm.
Length of funicle	0.15 mm.
Length of club	0.16 mm.
Length of pedicel	0.06 mm.
Width of pedicel	0.04 mm.

Material examined: Twee Rivieren (Kalahari Gemsbok National Park), February 1961, H. D. Brown, H. K. Munro and D. P. Annecke, from *Tachardina ?affluens* Brain on *Rhigozum trichotomum* Burch., holo- and ♀-paratype; idem, one ♀-paratype from same plant material infested with a mealybug (T 355, determined by Mr de Lotto as *?Pedrococcus* species). It is believed that this species is probably parasitic in the coccid rather than the mealybug and that the third specimen probably emerged from a coccid hidden on the foliage of the mealybug-infested plant material.

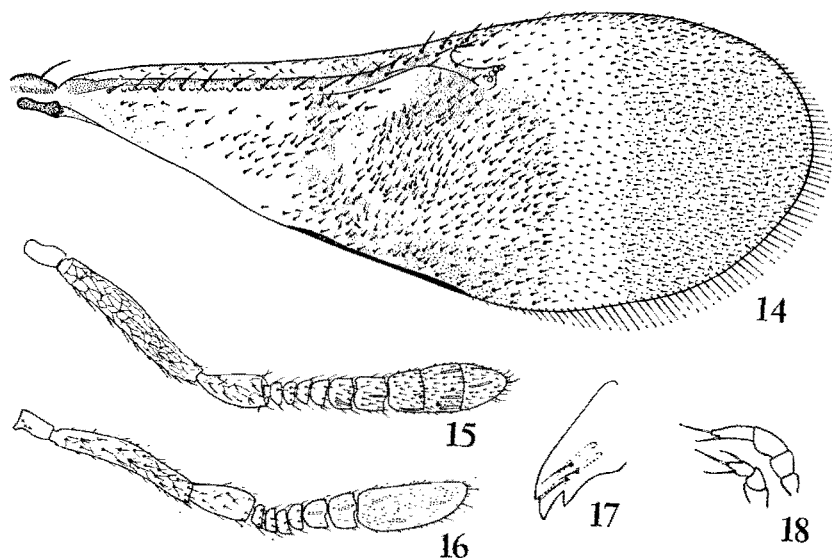
The foregoing species is named for the writer's assistant, Mrs M. J. Mynhardt, in recognition of her fine work as preparator and artist.

Waterstonia comperei spec. nov., figures 14-18

This seems to be the first species of the genus described from Africa. It may be distinguished from *Waterstonia prima* Mercet and *bifasciata*

(Timberlake) by the more shortly exerted ovipositor, and from *secunda* Mercet by the entirely dark abdomen and the posterior ocelli being close to the eye-margins; from *diversicolor* Compere it may at once be distinguished on colour characters. The present new species is named for Mr Harold Compere, as a tribute to his work on the Chalcidoidea.

FEMALE: Colour, in dorsal aspect, predominantly dark; mesoscutum except posterolaterally, and a patch on the ocellar area dark brown, shiny, reflecting metallic colours weakly; scutellum brown, becoming a little darker apically; head apart from ocellar area dull testaceous; abdomen entirely very dark brown, nearly black, shiny, not or scarcely reflecting metallic colours; laterally and ventrally the thorax is concolorous with the head; antenna brown, scape and club slightly lighter; gonostyli testaceous basally, becoming dark brown apically; legs with coxae and femora whitish, tibiae lightly suffused with brown particularly dorsally, tarsi brownish; forewings with infumations rather suggestive of *Melanaphycus clauseni* (Timberlake) (Compere, 1947: 6; note that Compere's printed drawing has almost lost the pale cross-band beyond the venation), with a large suboval infuscation in the disc beneath the stigmal vein surrounded basally and caudally by a narrow, curving, subhyaline band (the cephalic part of this band forms the cephalic part of the oblique hairless streak); basad and caudad of this band the wing is again infumated; beyond



Figs. 14-18. *Waferstonia comperei* spec. nov. 14. Forewing (♀-paratype T 359-1); 15. antenna (♀-paratype T 359-3); 16. antenna (♂ allotype); 17. mandible showing dentation, seen slightly obliquely (♀-paratype T 359-1); 18. maxillary and labial palpi (♀-paratype T 359-1).

the level of the stigmal vein there is a broad hyaline cross-band running from the cephalic to the caudal wing-margin; distad of the cross-band the wing is more or less evenly infuscated to the apex; the described wing-pattern is caused partly by a darkening of the blade of the wing, and partly by the presence, in the infumated areas, of coarse, short and rather stout setae; hind wing hyaline except for a small longitudinal infuscation arising at the base of the marginal vein and running obliquely basad towards the caudal wing-margin but not reaching the latter.

Head with ocelli in an acute-angled triangle; with the smallest distance between the eyes just less than one-third of the width of the head; posterior ocelli removed from the eye-margins by about one-half the diameter of an ocellus; in front of the anterior ocellus the eye-margins diverge slightly, reaching at their lowest point more than halfway down the dorsoventral length of the head; antennae inserted near the mouth, their sockets separated by just less than the smallest eye interval; mandibles with three sharp teeth, the middle one the longest, the outer two unequal (fig. 17); maxillary palpi with four, labial with three segments (fig. 18). Antenna (fig. 15) with radicle distinct, slender; scape long and slender, cylindrical, nearly three times as long as the pedicel, and about as long as the club and the last two funicle segments together; pedicel about as long as the first four funicle segments together, at widest about as wide as the scape; first to fifth funicle segments wider than long, the first three increasing in width and length, the last as wide as long; club about as long as the funicle, its segments of about equal length, its greatest width (at about the middle) not quite twice that of the pedicel; all club segments with a few, and the last two funicle segments each with one, longitudinal rhinaria, mainly dorsally placed; antenna sparsely and finely setose, the scape and pedicel with fine, reticulate sculpture visible in balsam mounts of cleared specimens.

Thorax with pronotum visible as a narrow band dorsally; mesoscutum without any trace of parapsidal furrows, with about 28 fine setae distributed mainly on the posterior two-thirds; axillae not quite meeting medially, each with three to four fine setae on the lateral parts; scutellum apically only partly obscuring the median part of the metanotum, with about 20 fine setae scattered over its surface, including a stouter subapical pair; scutellar pori, usually paired, placed at about the apical third of the sclerite; metanotum a slightly curved transverse band, with two and two small setae, one pair on either side of the apex of the scutellum, with the median part separated from the lateral parts by oblique, inwardly directed carinae, the median part lightly reticulate, and the lateral parts bare of sculpture; propodeum with paired, oblique carinae arising from near the metanotal carinae and running caudally, outward (making an angle of somewhat more than 90° with the metanotal carinae); propodeum not sculptured except lightly laterally, bare of setae dorsally; mesophragma extending shortly into the abdominal cavity, apically truncate or slightly emarginate.

Legs normal, with the tibial spur of the middle legs shorter than the first tarsal segment; hind tibial spurs double, unequal.

Fore wings (fig. 14) with postmarginal vein more or less distinct under high magnification, fading distally, shorter than the stigmal; the latter with the placoid sensilla arranged in a tight curve apically; submarginal vein distinctly widened apically, its length set with 10-12 peg-shaped setae; discal setae stout, short, peg-shaped, except in the transverse hyaline band where they are exceedingly small and fine; marginal cilia extremely short, scarcely projecting beyond the wing-margin except apically and on the distal hind margin where the fringe is distinct but short. Hind wing hyaline except as described, with fringe longer than on fore wing.

Abdomen about as wide as thorax in slide-mounts; hind margins of terga III-VI more or less transverse, that of VII produced caudad in a broad curve, that of VIII again more or less transverse medially; cercoids advanced to near the level of the middle of tergum VII; spiracles of eighth tergum visible through the integument of cleared specimens, placed caudad of the cercoids on the lateral recurved parts of the sclerite; ovipositor extending from the level of the apex of the mesophragma to beyond the tip of the abdomen, exerted for a little more than one-quarter of the length of the abdomen; ovipositor, except apically, contained by the abdominal sterna, the last one (hypogynium) being V-shaped posteriorly, its apex not extending quite to the tip of the abdomen; gonotergites (outer plates of ovipositor) upcurved distally to overlap shortly the tip of the abdomen which is thereby rendered somewhat truncate in dorsal view; gonostyli slender, exerted for about three-quarters of their length, not immovably ankylosed to the plates which bear them. Male similar to the female except in sex characters; antenna as in fig. 16; genitalia somewhat less than one-third as long as the abdomen.

Measurements:

♀ - holotype

Length of body	about 0.80 mm.
Width of head	" 0.28 mm.
Width of body across propodeum	" 0.29 mm.
Length of ovipositor and associated structures	" 0.27 mm.
Length of fore wing	" 0.62 mm.
Length of antenna (+ radicle)	" 0.45 mm.

♂ - allotype

Length of body	about 0.67 mm.
Length of fore wing	" 0.58 mm.
Length of antenna (+ radicle)	" 0.37 mm.

Material examined: Twee Rivieren (Kalahari Gemsbok National Park), 11.II.1961, H. D. Brown, H. K. Munro and D. P. Annecke, from a mealybug (T 355, determined as *Pedrococcus* species by Mr de Lotto from old and inadequate material) on *Rhigozum trichotomum* Burch., holo-, allo- and six ♀ - paratypes. Three types on slides, four on card-points and allotype on a slide.

first; labial palpi three-segmented; mandible (fig. 19) with two acute ventral teeth, the lower slightly the stronger, and a third, apically roundly truncate, dorsal one. Antenna (fig. 21) with radicle twice as wide as long, scape slightly expanded ventrally, about as long as the pedicel and first four funicle segments together; pedicel about twice as long as its apical width, about as long as the first two and half of the third funicle segments together; first funicle segment longer ventrally than dorsally, about as wide as its greatest length; remaining funicle segments all wider than long, becoming progressively wider, the last one about twice as wide as long; club obliquely truncate on inner dorsal surface, longer than the last three funicle segments together and at widest wider than the preceding segment; outer, upper and lower surfaces of each of the last five funicle segments with rhinaria, sparse on the second and third segments, progressively more numerous on the remaining segments of the funicle; outer aspect of each funicle segment with a sense-cone near the apex; club with two transverse rows of rhinaria on the outer aspect; oblique flattened truncation with a few rhinaria and numerous sense-cones; antenna finely setose, the setae more numerous distally; scape, pedicel and funicle with a fine network of reticulations.

Thorax dorsally nearly one and a half times longer than its width across the propodeum; pronotum extremely short in dorsal view, prosternum with entire internal carina; mesoscutum with distinct, incomplete parapsidal furrows, each oblique, nearly parallel to the scutoscuteellar suture, their mesal ends well separated from the midline of the thorax and from the hind mesoscutal margin; axillae meeting broadly medially, not or scarcely raised above the level of the scutellum; the latter sloping rather strongly laterally and posteriorly, the disc more or less flat; metanotum medially obscured by the tip of the scutellum; propodeum with spiracles well advanced.

Legs without special modifications, tibial spur of middle leg shorter than the basal tarsal segment of the latter.

Fore wing (fig. 22) about two and three-quarters times longer than wide, the tip of the stigmal vein at about the middle of its length; the latter vein arising before the end of the submarginal, making nearly a right angle with it; infuscation as described; beyond the level of the venation, the wing is evenly setose; hind wing with venation somewhat expanded basally, hyaline. Abdomen in distended slide-mounted specimens, nearly as long as the thorax, with ovipositor a little shorter than middle tibia, gonostyli about two-thirds as long as the tibial spur of middle legs; cercal plates only slightly advanced to a position forward of the level of the functional spiracles on the laterally recurved parts of the eighth tergum; gonostyli sometimes slightly exerted beyond the tip of the abdomen; last ventral sternite in the form of a hypogynium, enclosing the ovipositor to about the level of the bases of the gonostyli.

MALE: difficult to distinguish from the female at low magnifications; antenna (fig. 20) with fewer rhinaria, and with segments having slightly different proportions; in one slide-mounted specimen the third and fourth funicle segments of the right antenna are partly fused.

Material examined: Zebediela (Tvl.), no date, H. J. Merrem, ex cocoons of green lace-wings on citrus, holo- and 78 paratypes, T 503; idem, March 1957, D. P. Annecke, one ♂- and two ♀-paratypes, AcPL 961; Pretoria (Tvl.), March-April 1953, E. C. G. Bedford, taken in association with *Ceroplastes helichrysi* var. *sinoiae* Hall on Jacaranda trees, 12 paratypes, AcPL 508. The holo-, allo- and 14 paratypes of both sexes are preserved dry, 27 paratypes are preserved in alcohol and five ♂- and five ♀-paratypes are on slides.

This new species is named for Mr P. H. Timberlake, University of California Citrus Experiment Station, Riverside, whose work on the Hymenoptera over about 50 years stands as a model for critical taxonomy. *Isodromus timberlakei* appears to be the first species added to the genus since Timberlake's revision was published in 1919; it appears also to be the first record of the genus from the Ethiopian region. The species is apparently similar to *I. iceryae* Howard from which it may be separated by several obvious and apparently constant colour characters such as the single dark band on the hind tibia and the predominantly yellow axillae.

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